

Build it so They Will Come...A World Wide Web Server Within the VA's DHCP System for the Delivery of Clinical Data

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Background. Prior to 1993 the VA's DHCP system lacked any significant clinician-used applications. In 1993, the local Medical Informatics team developed and introduced a DHCP-based version of the Regenstrief Medical Record System (RMRS). This provided a much needed but missing component of the current DHCP system - a patient centered clinical data repository. In 1994 we introduced an on-line narrative system that permits clinicians to view all available narrative reports (discharge summary, progress notes, radiology, surgery, laboratory, echos, etc.) for any one patient from a single DHCP menu option.

The "if you build it, they will come" theory did not pan out as providers still did not embrace the computer as a definitive clinical data resource. Contributing to this problem was the DHCP roll-and-scroll user interface and its inherent limitations. At a critical juncture, we began serious discussions about moving our clinical applications to a GUI environment. About this same time the World Wide Web was bursting onto the scene.

System. In 1995, we introduced WebMan. WebMan is an M-based, FileMan compatible WWW server that supports a number of advanced features including: Multiple realms with separate configuration settings, configurable TCP port allocation, basic authentication support via DHCP and non-DHCP user databases, DHCP integration support through CGI interface toolset, HTML templates with just-in-time resolution of imbedded parameters (i.e. M extrinsic functions), server-side clickable maps, support for user-level persistent state information, remote shutdown and a special trace mode for debugging.

Once the server was complete work centered around CGI's to the clinical repository. HTML-based interfaces were programmed for the RMRS Patient Inquiry option, the Narrative Reports Option and DHCP's MailMan.

Evaluation. The impact of GUI data delivery exceeded most expectations. We periodically monitored active WEB-based connections to our DHCP host and found a 5-10 percent increase in new daily active users. These new users were seldom, if ever, using the computer at all before WebMan. Through periodic interviews with the users of WebMan another significant benefit was realized. Outpatient clinic chart repulls were eliminated about 25 percent of the time after introduction of WebMan.

An integrated Web server also resulted in reduced CGI programming. By providing a DHCP FileMan toolset within WebMan most of the CGI development utilized existing application programs.

In February, 1997 the Indianapolis VA was recognized by COMPUTERWORLD¹ magazine as a member of the Premier 100 Organizations through our use of the Internet and Web technologies. WebMan's connection to our patient databases was a key factor in receiving this distinguished honor.

Conclusions. Our initial project offered clinical data in a more coherent form, but the roll-and-scroll interface prevented clinicians from seeing its value. The second version provided the same data but in a friendlier graphical environment (Web interface) leading to enhanced usage and acceptance of computerized clinical data.

WebMan not only helped break the ice for clinician based computing but also set the stage for future GUI based applications such as a local Delphi developed Clinical Workstation currently in pilot testing.

In demand throughout the VA, WebMan will help realize the ultimate benefit of an intranet system by serving data at both the local and national levels.

References

¹ COMPUTERWORLD, Supplement, February 24, 1997, The Premier 100 On Track to Internet Success